Farmland Loss and Poverty in Hanoi's Peri-Urban Areas, Vietnam: Evidence from Household Survey Data

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Abstract

Using a dataset from a 2010 field survey involving 477 households, this paper has contributed to the literature by providing the first econometric evidence for the impacts of farmland loss (due to urbanization and industrialization) on household poverty in Hanoi's peri-urban areas. Factors affecting poverty were examined using a logit regression model. Our econometric results indicate that the one and two-year effects of farmland loss on poverty are not statistically significant. These results, therefore, confirm that farmland loss has had no impact on poverty in the short-term. This study also found that factors contributing to poverty reduction include households' education, access to credit, ownership of productive assets and participation in nonfarm activities before farmland loss. We propose some policy implications that can help households escape poverty and improve their welfare.

Key words

Farmland loss, poverty effects, household welfare, peri-urban areas.

Introduction

Over the past two decades, escalated industrialization and urbanization have encroached on vast areas of agricultural land in Vietnam. Le (2007) estimated that, from 1990 to 2003, 697,417 hectares of land were compulsorily acquired by the State for the construction of industrial zones, urban areas and infrastructure and other national use purposes[1]. In the period from 2000 to 2007, about half a million hectares of agricultural land were converted for non-farm use purposes, accounting for 5 percent of the country's farmland (VietNamNet/TN, 2009). In Vietnam, the majority of the poor are farmers whose livelihoods are mainly based on agriculture (World Bank [WB], 2012). As a result, the State's farmland acquisition has a major effect on the poor in Vietnam's rural and peri-urban areas (Asian Development Bank [ADB], 2007).

In the context of increasing farmland loss due to urbanization and industrialization in Vietnam's developed provinces and cities, a number of studies have examined the impacts of farmland loss on poverty and household welfare (Do, 2006; Nguyen et al., 2011; Nguyen et al., 2013; Nguyen, 2009). In general, these studies indicated that farmland loss has mixed impacts on household welfare and poverty. On the one hand, the loss of farmland has caused the loss of farm jobs and income. On the other hand, farmland loss for urban expansion and industrial development has resulted in new urban areas, industrial zones and improved local infrastructure. Such changes have offered local households wide choices of non-farm jobs through which they can change their livelihoods and improve their welfare. Unfortunately, not all households have seized new livelihood opportunities triggered by urbanization and industrialization. Nguyen et al. (2005) found that while a number of land-losing farmers who resided close to newly urbanized areas earned higher cash income than farm work; other land-losing farmers, particularly those with low levels of education, became jobless and impoverished. Similar results were also reported by ADB (2007). About two thirds of land-losing households benefited

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[1] Compulsory land acquisition is applied to cases in which land is acquired for national or public projects; for projects with 100 percent contribution from foreign funds (including FDI (Foreign Direct Investment) and ODA (Official Development Assistance)); and for the implementation of projects with special economic investment such as building infrastructure for industrial and services zones, hi-tech parks, urban and residential areas and projects in the highest investment fund group (World Bank, 2011).

from higher job opportunities and upgraded infrastructure; for the rest, land acquisition resulted in serious economic interruption, particularly if all productive land was acquired or family members did not attain suitable education or vocational skills to switch to new jobs (ADB, 2007).

The results from a large-scale survey conducted by Le (2007) in Vietnam's eight developed cities and provinces with the highest level of farmland loss showed that after losing land, 25 percent of land-losing households obtained a higher level of income, while 44.5 percent maintained the same level and 30.5 percent experienced a decline. Nguyen et al. (2013) found that although the majority of land-losing households have changed to new livelihoods and earned a much higher level of income than before land loss, there have been a number of households with unchanged income or earned less income than before losing land. Mixed impacts of farmland loss are not confined to Vietnam. Some negative impacts of farmland loss on household welfare have been observed elsewhere, for example in China (Chen, 2007, Deng et al., 2006) and India (Fazal, 2000, 2001). Nevertheless, other studies found positive impacts of farmland loss on rural household welfare in China (Chen, 1998, Parish et al., 1995) and Bangladesh (Toufique and Turton, 2002).

The motivation to pursue this topic stems from two main reasons. First, while many studies investigated the impacts of farmland loss on household welfare and poverty, their findings are mixed. Second, all the studies indicated above used qualitative methods or descriptive statistics and this obviously limits our understanding. Using a dataset from a 2010 field survey, our study contributes to the literature by providing the first econometric evidence of the impact of farmland loss on poverty in Hanoi's peri-urban areas.

Materials and methods

1. Location and description of study area

Hoai Duc, a peri-urban district of Hanoi, was selected for this study. Of the districts of Hanoi, Hoai Duc has the biggest number of land acquisition projects (Huu Hoa, 2011). Hoai Duc is situated on the northwest side of Hanoi, 19 km from the Central Business District. The district has an extremely prime location, surrounded by many important roads, namely Thang Long highway (the country's biggest and most modern highway)

and National Way 32, and is in close proximity to new industrial zones, new urban areas and Bao Son Paradise Park (the biggest entertainment and tourism complex in North Vietnam). In the period 2006-2010, the State conducted the compulsory acquisition of around 1,560 hectares of agricultural land for 85 projects in the district (LH, 2010). As a result, the farmland acquisition has significantly reduced the size of farmland per households in the district. The average size of farmland per household in the district was about 840 m^2 in 2009 (Hoai Duc District People's Committee, 2010a) which was much lower than that in Ha Tay Province (1,975 m^2) and much smaller than that of other provinces (7,600 m^2) in 2008 (Central Institute for Economic Management [CIEM], 2009).

Prior to 1st August 2008, Hoai Duc was a district of Ha Tay Province, a neighbouring province of Hanoi Capital, which was merged into Hanoi on 1st August 2008. The district has 8,247 hectares of land, of which farmland makes up 4,272 hectares: 91 percent of this area is used by households and individuals (Hoai Duc District People's Committee, 2010a). There are 20 administrative units in the district, including 19 communes and 1 town. Hoai Duc has around 50,400 households with a population of 193,600 people. Prior to its transfer to Hanoi, Hoai Duc was the richest district in Ha Tay Province (Nguyen, 2007). In 2009, Hoai Duc's income per capita reached 15 million Vietnam Dong (VND) per year (Hoai Duc District People's Committee, 2010b), which is less than half of Hanoi's average (32 million VND per year) (Vietnam Government Web Portal, 2010)[2].

2. Sources and methods of data collection

Adapted from the General Statistical Office [GSO] (2006), we designed a household questionnaire to gather quantitative data on households' characteristics and assets, economic welfare (income and consumption expenditure) and their income-earning activities before and after the State conducted the compulsory acquisition of farmland in the commune in which they resided. A sample size set at 480 households from 6 communes, consisting of 80 households (40 with land loss and 40 without land loss) from each commune, was randomly selected for research purposes. Therefore, 600 households were selected, including 120 reserves, to obtain the target sample size of 480 households. A disproportionate stratified sampling

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[2] 1 USD equated to about 18,000 VND in 2009.

method was used with two steps as follows: First, 12 communes with farmland loss (due to the State's land acquisition) were partitioned into 3 groups based on their employment structure. The first group included three agricultural communes; the second one was characterised by five communes with a combination of both agricultural and non-agricultural production while the third one represented four non-agricultural communes. From each group, 2 communes were randomly chosen. Then, from each of these communes, 100 households (50 with land loss and 50 without land loss) including 20 reserves (10 with land loss and 10 without land loss) were randomly selected using Circular Systematic Sampling.

The survey was carried out from the beginning of April to the end of June 2010, and the data were collected by means of face-to-face interviews with the head of a household in the presence of other household members. In total, 477 households were successfully interviewed, among which 237 households had lost their farmland at different levels. Some had lost little, some had lost part of their land, whereas others had lost most or all of their land. Their farmland was compulsorily acquired by the State for a number of projects relating to the enlargement and improvement of Thang Long highway, the construction of industrial clusters, new urban areas and other non-farm use purposes (Ha Tay Province People's Committee, 2008). Due to some delays in the implementation of the farmland acquisition, of the 237 land-losing households, 124 households had farmland acquired in the first half of 2008 and 113 households had farmland acquired in early 2009. In the remainder of this paper, households whose farmland was lost partly or totally by the State's compulsory land acquisition will be referred to as "land-losing households".

3. Analytical model

Based on the 2010 poverty line for Vietnam proposed by GSO and WB (WB, 2012), we defined a household as poor if its monthly consumption expenditure per person is less than 653,000 VND. Once the household sample was clustered into poor and non-poor groups, statistical analyses were employed to compare the mean of assets and welfare between the poor and non-poor households. As indicated by Gujarati and Porter (2009), there is a variety of statistical techniques for examining the differences in two or more mean values, which generally have the name of analysis of variance. Nevertheless, the same can be obtained within the framework of regression analysis. Therefore, regression analysis using Analysis of Variance (ANOVA) model was used to investigate the differences in the mean of assets and welfare between the poor and non-poor households. In addition, a chi-square test was used to determine whether a statistically significant relationship existed between two categorical variables such as the type of households (poor and non-poor households) and gender of household heads.

The study used a logit regression model with the dependent variable (poverty) being a binary variable that has a value of one if a household was found to be poor and a value of zero otherwise. The probability of households falling into poverty was assumed to be determined by their household characteristics and assets. In addition, other factors, in this case the loss of farmland and the participation by households in nonfarm activities before farmland acquisition were included as regressors in the model. Finally, commune dummy variables were also included in the model to control for fixed commune effects.

Table 1 describes the definition and measurements of variables included in the model. Empirical evidence in Vietnam's rural areas indicated that the larger household size, the greater likelihood of remaining in poverty (Van de Walle and Cratty, 2004). In addition, households with more dependent members were found to have higher chances of being poor (Nguyen et al., 2013). Therefore, households with more family members and a higher dependency ratio were expected to be more likely to be poor. Households with better education were found to be more likely to be non-poor (Nguyen et al., 2013). As a result, working age members with higher education levels were expected to increase the probability of their households escaping poverty. However, the poverty effect of the age of working age members might be ambiguous. Younger members were found to have higher chances to take up lucrative nonfarm jobs (Tuyen and Lim, 2011), which in turn might reduce the likelihood of being poor. Nevertheless, older members tend to have more work experience and can work more productive (Nghiem et al., 2012), which might reduce the probability of falling in poverty. Having more agricultural land increases rural household welfare in Vietnam (Van de Walle and Cratty, 2004). Hence, households owning more farmland per adult were expected to be more likely to escape

Independent variables	Definition	Measurement
Poverty status	A household is defined as poor if its monthly consumption expenditure per capita is less than 653,000 VND.	Poor = 1; non-poor = 0
Explanatory variables		
Farmland loss		
Land loss 2009	The proportion of farmland that was compulsorily acquired by the State in 2008.	Ratio
Land loss 2008	The proportion of farmland that was compulsorily acquired by the State in 2008.	Ratio
Household characteristics		
Household size	Total household members.	Number
Dependency ratio	This ratio is calculated by the number of household members aged under 15 years and over 59 years, divided by the number of household members aged 15-59 years.	Ratio
Age of household head	Age of household head.	Year
Gender of household head	Whether or not the household head is male.	Male = 1; Female = 0
Age of working age members	Average age of members aged 15-59 years.	Years
Education of working age members	Average years of formal schooling of members aged 15-59 years.	Years
Natural capital		
Farmland per adult	Owned farmland size per members aged 15 and over.	m^2
Physical capital		
Productive assets	Total value of productive assets.	Natural log
Financial capital		
Formal credit	Total value of loans borrowed from banks or credit institutions in the last 24 months.	1,000 VND
Informal credit	Total value of loans borrowed from friends, relatives or neighbours in the last 24 months.	1,000 VND
Non-farm participation in the past		Dummy variable
Formal wage work[1]	Whether or not the household took up formal wage work before farmland acquisition.	Yes = 1; otherwise = 0
Informal wage work[2]	Whether or not the household took up informal wage work before farmland acquisition.	Yes = 1; otherwise = 0
Nonfarm self-employment[5]	Whether or not the household took up nonfarm self-employment before farmland acquisition.	Yes = 1; otherwise = 0
Commune variables	The commune in which the household resided (Lai Yen Commune is the base group)	Dummy variable

Note:

[1] Formal wage work are paid jobs that are regular and relatively stable in factories, enterprises, state offices and other organizations with a formal labour contract and often require skills and higher levels of education.

[2] Informal wage work includes paid jobs that are often casual, low paid and without a formal labour contract. These jobs often require no education or low education levels.

[3] Nonfarm self-employment is self-employment in nonfarm activities.

Source: Source: own procesing

Table 1: Definition and measurements of variables included in the model.

poverty. Nghiem et al. (2012) found that ownership of more productive assets has a positive effect on household welfare in rural Vietnam. Thus, holding more productive assets was expected to increase the probability of households getting out of poverty. Finally, access to formal credit (Nguyen, 2008) and informal credit (Nguyen, 2009) was found to have a positive impact on household welfare in Vietnam. Consequently, households that received a higher amount of loans from formal or informal credit sources were expected to have a lower probability of being poor.

Nonfarm participation was found to be a determinant of poverty reduction and household welfare in Vietnam's rural areas (Pham, Bui, and Dao, 2010; Van de Walle and Cratty, 2004). However, the inclusion of households' nonfarm participation as an explanatory variable in the model might suffer from the potential endogeneity (Van de Walle and Cratty, 2004). This is because nonfarm participation might be determined by household characteristics, assets and other exogenous factors. Therefore, we included the past nonfarm participation variables (participation in nonfarm activities before farmland acquisition) in the model as explanatory variables instead of including the current nonfarm participation variables. Households with past participation in any non-farm activity were hypothesized to have a lower risk of being poor than those without past participation in any non-farm activity.

In the present study, the loss of farmland of households is an exogenous variable, resulting from the State's compulsory farmland acquisition[3]. The farmland acquisition by the State took place at two different times; therefore, land-losing households were clustered into two groups namely (i) those that had farmland acquired in 2008 and (ii) those that had farmland acquired in 2009. The reason for this division is that different lengths of time since farmland acquisition were expected to have different effects on poverty. In addition, the level of farmland loss was quite different between households because as already noted, some had lost little while others had lost all their land. Therefore, the level of farmland loss, as measured by the proportion of farmland acquired by the State in 2008 and in 2009, was used as the variable of interest.

Results and discussion

1. Background on household characteristics, assets and welfare

As shown in Table 2, the number of poor households was estimated at 64 households, accounting for 13.21 percent of the whole sample. The poverty gap and poverty severity (squared poverty gap) indexes were calculated at around 1.84 percent and 0.44 percent, respectively. The poverty rate of 13.21 percent in the study area is somewhat

higher than that in the Red River Delta (including Hanoi) (11.4 percent) in 2010 (WB, 2012). Table 2 provides some information about household income and consumption expenditure for the whole sample as well as for poor and non-poor households. The non-poor households earned nearly twice as much income per capita as the poor households did. A similar difference between two groups was also observed in the case of consumption expenditure per capita.

The differences between two groups of households in the loss of farmland in both years were found not to be statistically significant. Poor households had a much higher dependency ratio than that of non-poor households and this difference is highly statistically significant. The statistically significant difference in the age of household heads and education of working age members between the two groups were also recorded. On average, household heads of the non-poor households were fours year younger than those of the poor households. In addition, working age members of the non-poor households had attained a higher level of education than those of the poor households.

The disparities in farmland per adult and total value of productive assets between two groups are statistically significant. The size of farmland per adult owned by poor households was quite smaller than that owned by non-poor households. In addition, the poor-households owned approximately twice as much the total value of productive assets as that of the poor-households. Finally, the non-poor households also received a higher value of loans from both informal and formal credit sources than the poor households. Noticeable differences in some household characteristics and assets between the two groups were expected to be closely linked with the probability of households being poor.

The shares of households participating in nonfarm activities before farmland acquisition were very different between the two groups. The results show that a statistically significant association existed between the type of households and their participation in some type of nonfarm jobs before the farmland acquisition. Only nine percent of poor-households had taken up formal wage work before the farmland acquisition. This figure was only one third as compared to that of non-poor households. In addition, the proportion of the non-poor households that had participated in nonfarm self-employment before farmland loss was also much higher than that of the poor

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[3] According to Wooldridge (2013), an exogenous event is often a change in the State's policy that affects the environment in which individuals and households operate.

Variables	Whole sample		Poor households		Non-poor households		t-value	Pearson chi2 (1)
	Mean	SD	Mean	SD	Mean	SD		
Household welfare								
Monthly income per capita[a]	1,126	*591*	597	170	1,211	590	-15.43***	
Monthly consumption								
expenditure per capita[a]	938	*290*	555	77	1,000	263	-23.19***	
Farmland loss (%)								
Land loss 2009	10.27	*24.50*	9.60	*26.00*	10.40	*24.33*	-0.19	
Land loss 2008	10.50	*24.00*	13.26	*28.12*	10.06	*23.26*	0.81	
Household characteristics								
Household size	4.49	*1.61*	4.71	*1.65*	4.45	*1.61*	0.97	
Dependency ratio	60.58	*66.78*	90.00	*87.46*	56.43	*62.31*	2.17**	
Gender of household head[b]	0.78	*0.48*	0.78	*0.42*	0.77	*0.42*		2.69
Age of household head	51.21	*13.24*	54.70	*13.58*	50.67	*12.06*	1.90*	
Age of working age members	35.00	*6.61*	33.63	*7.07*	35.20	*6.50*	-1.31	
Education of working age members	9.07	*2.54*	8.03	*2.63*	9.23	*2.50*	-2.79***	
Natural capital								
Farmland per adult	343.00	*278.00*	265.00	*196.00*	355.00	*287.00*	-2.66 ***	
Physical capital								
Total value of productive assets[a]	22,081	*20,090*	11,232	*13,103*	23,733	*20,426*	-5.17***	
Financial capital								
Formal credit	8,533	*33,333*	3,182	*6,746*	9,347	*35,618*	-2.74***	
Informal credit	4,685	*14,836*	2,805	*6,249*	4,971	*15,723*	-1.80*	
Participation in nonfarm activities in the past								
Formal wage work[b]	0.24	*0.43*	0.09	*0.30*	0.27	*0.44*		5.61**
Informal wage work[b]	0.33	*0.47*	0.37	*0.48*	0.33	*0.47*		0.09
Nonfarm self-employment[b]	0.34	*0.47*	0.20	*0.40*	0.36	*0.48*		10.97***
Total	477		64		413			

Note: Refer to Table 1 for definitions and measurements of variables.

[a] Household welfare, physical and financial capital measured in 1,000 VND.(1 USD equated to about 18,000 VND in 2009).

[b] Indicate dummy variables. Means and standard deviations (SD) are adjusted for sampling weights.

*, **, ** * mean statistically significant at 10%, 5 % and 1 %, respectively.

Source: Field survey, 2010.

Table 2: Descriptive statistics of household demographic characteristics, assets and welfare.

households (36 percent versus 20 percent). These findings suggest that households' past participation in some type of nonfarm jobs was expected to be closely associated with the likelihood of being poor.

2. Determinants of household poverty

Table 3 reports the estimation results from the logit model. The results indicate that many explanatory variables are statistically significant at 10 percent or lower level, with their signs as expected. Surprisingly, the results show that the coefficients on the land loss variables in both years are not statistically significant. These confirm that

farmland loss has not affected poverty in the short-term. This phenomenon might be explained by two main reasons. First, many land-losing households have used part of their compensation money (for land loss) for smoothing consumption. As revealed by surveyed households, 61 percent of land-losing households reported spending part of their compensation money for daily expenses[4]. Second, land-losing households have actively

[4] As revealed by the surveyed households, each household on average received a total compensation of 98,412,000 VND. The minimum and maximum amounts were 4,000,000 VND and 326,000,000 VND, respectively.

diversified their labour into various nonfarm activities in order to supplement their income with nonfarm income sources. As a result, incomes earned from nonfarm sources might have compensated for a shortfall of income due to farmland loss. This explanation is well supported by the econometric findings obtained by Tuyen and Lim (2011) and Tuyen and Huong (2013), who found that under the impact of land loss, land-losing households have intensively participated in different nonfarm activities. Their research findings also indicated that while farmland loss

has a negative effect on farm income source; it has a positive effect on various nonfarm income sources. In addition, other survey result findings also showed that after losing land, households' income from agriculture significantly declined but their income from nonfarm sources considerably increased (Le, 2007).

As expected, households having more members and more dependent members are more likely to be poor. An additional member increases the odds of a household being poor by around 28 percent,

Explanatory variables	Coefficient	SE	Odds ratio	SE
Farmland loss				
Land loss 2009	-1.593	(1.313)	0.203	(0.267)
Land loss 2008	-1.534	(0.963)	0.216	(0.208)
Household characteristics/human capital				
Household size	0.252*	(0.134)	1.286*	(0.172)
Dependency ratio	0.492*	(0.269)	1.636*	(0.441)
Household head's gender	-0.005	(0.420)	0.995	(0.418)
Education of working age members	-0.071*	(0.040)	0.932*	(0.037)
Age of working age members	-0.200**	(0.089)	0.818**	(0.073)
Natural capital				
Farmland per adult	-0.443**	(0.192)	0.642**	(0.123)
Physical capital				
Productive assets	-0.908***	(0.208)	0.403***	(0.084)
Financial capital				
Formal loans	-0.028*	(0.016)	0.972*	(0.016)
Informal loans	-0.051**	(0.021)	0.950**	(0.020)
Participation in nonfarm activities in the past				
Formal wage work	-1.729***	(0.642)	0.177***	(0.114)
Informal wage work	-1.498**	(0.757)	0.224**	(0.169)
Nonfarm self-employment	-1.682***	(0.570)	0.186***	(0.106)
Commune				
Song Phuong	-1.511**	(0.601)	0.221**	(0.133)
Kim Chung	-3.484***	(1.247)	0.031***	(0.038)
An Thuong	-0.440	(0.574)	0.644	(0.370)
Duc Thuong	-2.230***	(0.680)	0.108***	(0.073)
Van Con	-0.785	(0.592)	0.456	(0.270)
Constant	13.315***	(3.456)	605,936.740***	(2,093,896.363)
Wald chi2(19)		58.73		
Pseudo R2		0.3268		
Prob > chi2		0.0000		
Observations		460		

Note: Robust standard errors in parentheses. Estimates are adjusted for sampling weights. *,**,*** mean statistically significant at 10%, 5%, and 1%, respectively. NA: non-applicable

Source: Field survey, 2010

Table 3: Logit estimation for determinants of poverty.

holding all other things constant. Households with working age members having a younger average age were found to be more likely to be non-poor. In accordance with the previous findings in Hanoi and Ho Chi Minh Cities by Nguyen et al. (2013), the current study found that households with better education are less likely to be poor. For a one year increase in the average years of formal schooling of working age members, it is expected to see about a 7 percent decrease in the odds of a household being poor, holding all other factors constant. Regarding the role of household assets in poverty reduction, the results show that households with more farmland are less likely to be poor. Households that owned more productive assets are more likely to get out of poverty. Finally, the probability of households being poor is also reduced by receiving a higher amount of formal or informal loans. In general, these findings are similar to that of the previous findings by Nghiem et al. (2012) who found that households' farmland size, ownership of assets and access to credit all have a positive effect on poverty reduction in Vietnam.

The results indicate that households that participated in any nonfarm activity in the past (before farmland acquisition) are much less likely to be poor. For example, holding all other variables constant, the odds of being poor for households with past participation in formal wage work is about 82 percent lower than the odds of those without past participation in formal wage work. The results confirm the importance of nonfarm participation to poverty reduction in peri-urban areas. Overall, this finding is partly in line with that in rural Vietnam by Van de Walle and Cratty (2004) and Pham et al. (2010). Finally, some commune dummy variables being statistically significant suggests that there may be variable (s) which were not explicitly specified in the model but were captured by the dummy variables for some communes. This implies that poverty may be affected by many factors at commune-level such as land fertility, access to markets, population density and nonfarm opportunities.

Conclusion

The relationship between farmland loss (due to urbanization and industrialization) and household poverty has been examined in previous studies using qualitative analysis or descriptive statistics. Going beyond the literature, the current study has quantified this relationship by using

a household-level dataset from a 2010 field survey and econometric tools. Econometric analyses indicated that the one and two-year effects of farmland loss on poverty are not statistically significant. These results confirmed that the loss of farmland has not led to a short-term increase in poverty in Hanoi's peri-urban areas. However, one might argue that the long-term poverty effects of farmland loss would occur among land-losing households when they have run out of compensation money and been unable to find alternative livelihoods. Thus, this suggests that further studies should examine the long-term effects of farmland loss on poverty using data observed for the longer period of time.

The study showed that some asset-related variables have a positive relationship with poverty reduction. Education, productive assets, and access to credit all have a positive effect on the reduction of poverty. A possible policy implication here is that governmental support for local households' access to formal credit can help them to have more financial resources and to accumulate more productive assets; these, in turn, allow them to escape poverty. Encouraging parental investment in their children's education will also be a way to improve living standards for the next generation.

This study confirms the important role of nonfarm participation in poverty reduction in peri-urban areas. This finding implies that if the government wants to help local poor households get out of poverty and improve their living standards, government assistance in improving their access to nonfarm activities can be an effective way. Nevertheless, access to lucrative nonfarm activities in Hanoi's peri-urban areas has been found to be determined by a number of factors such as education, access to formal credit, a prime location for doing nonfarm businesses (Tuyen and Huong, 2013; Tuyen and Lim, 2011), access to local markets (Bich Ngoc, 2004), and the level of development of local infrastructure (Nguyen, 2009). As a result, policy intervention in these factors in terms of providing favourable conditions for them to diversify into more profitable nonfarm activities can help local poor households escape out of poverty and improve their welfare.

Acknowledgements

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